SPOTLIGHT ON
MARYLAND

MHCC MARYLAND HEALTH CARE COMMISSION

DIABETES AMONG MARYLAND'S PRIVATELY INSURED, NON-ELDERLY POPULATION

How does the use of hospital and non-hospital services affect spending?

More than 373,000 Maryland residents—almost 9 percent of the State's population—were living with diabetes in 2008.[1] Nearly 150,000 additional Marylanders had "borderline" or pre-diabetes.[2] Diabetes that is not properly managed, or "uncontrolled" diabetes, can lead to heart disease, lower limb amputations, blindness, and kidney disease.[3] In 2007, there were 27,000 hospitalizations in Maryland due to diabetes-related complications.[4]

Although it is a chronic (lifelong) disease, diabetes can be prevented and managed with lifestyle changes in diet and exercise and with proper medical care. Studies have shown that outpatient management of diabetes may reduce the likelihood of hospitalization.[5]

Although diabetes is most common in the elderly, it also represents a serious health risk for those younger than age 65. Moreover, a recent study showed that, while privately insured adults aged 18 to 64 were more likely than their uninsured or publicly insured counterparts to receive appropriate diabetes-related health screenings, even among those with private coverage, the receipt of health screenings was still less than optimal.[6]

This Spotlight examines the use of health care services related to diabetes for a study population of privately insured Maryland residents aged 18 to 64. Presence of diabetes is defined by having used at least one professional service with a diagnosis of diabetes in 2007. The focus is on hospital stays related to diabetes and, specifically, how diabetes-related outpatient care—visits to health professionals in office-based and other non-emergency, ambulatory care settings—relates to the need for inpatient hospitalizations.[7]

MORE ABOUT DIABETES...

- Type 2 diabetes—the most common form—is a chronic (lifelong) disease marked by high levels of sugar in the blood. It begins when the body does not produce enough insulin (a hormone released by the pancreas) or the cells ignore the insulin.
- Approximately 11 percent of people in the United States aged 20 years and older have diabetes, and 1.6 million new cases are diagnosed every year.
- Diabetes is the leading cause of lower limb amputations, blindness, and kidney failure; it was the seventh leading cause of death in 2006.
- Diabetes can be effectively managed through regular self-monitoring of blood glucose, consistent medical follow-up, and lifestyle changes such as eating well-balanced meals and increasing levels of physical activity.
- The total cost of medical care for diagnosed diabetes in the United States in 2007 was approximately $116 billion.

http://www.diabetes.org/diabetes-basics/

HOW MUCH HEALTH CARE IS USED BY PERSONS WITH DIABETES? There were 152,000 persons in the study population. Users of diabetes services were evenly divided between males and females, and about two-thirds were over the age of 50. For the purposes of this analysis, the study population was divided into three evenly-sized "risk" groups based on the individuals' need for medical care, as measured by an "expenditure risk score." The expenditure risk score was based on a person's likelihood of incurring health care expenditures for any of his or her diagnosed conditions (including diabetes).[8]

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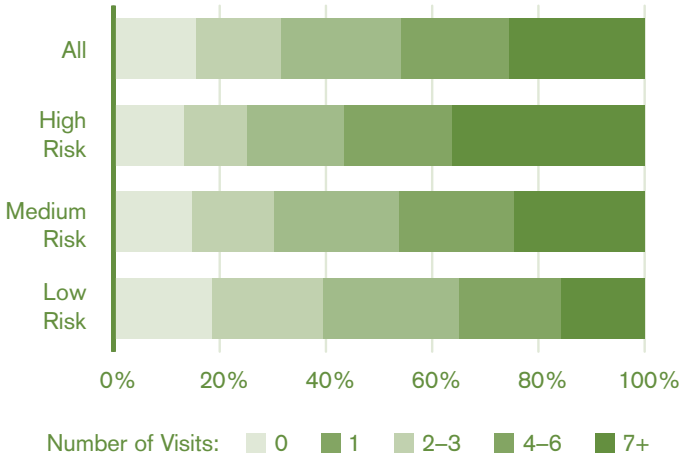
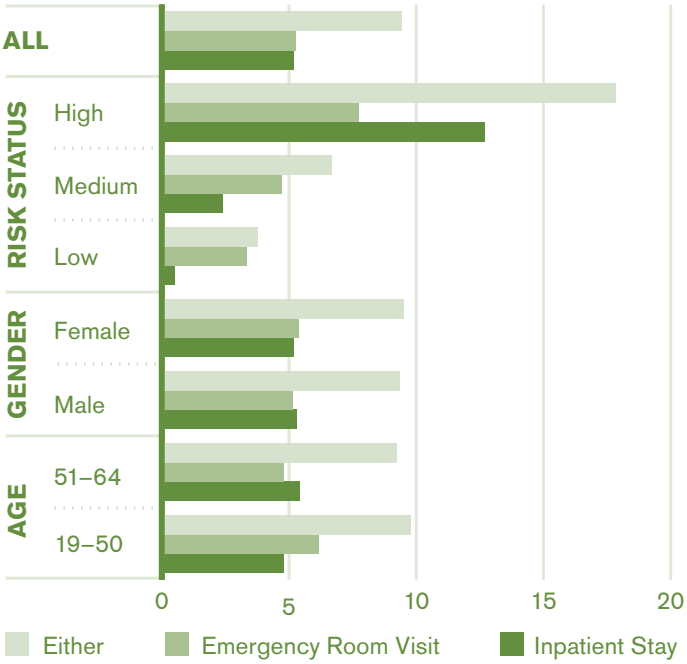
FIGURE 1. Distribution of non-emergency, outpatient diabetes-related visits for persons with diabetes, by health care expenditure risk, 2007



SOURCE: Tabulations from the 2007 Maryland Medical Care Data Base. Maryland residents aged 18–64, with private insurance and having used at least one professional service with a diagnosis of diabetes in 2007.

FIGURE 2. Percentage of persons with diabetes with at least one diabetes-related inpatient hospital stay or emergency room visit, 2007



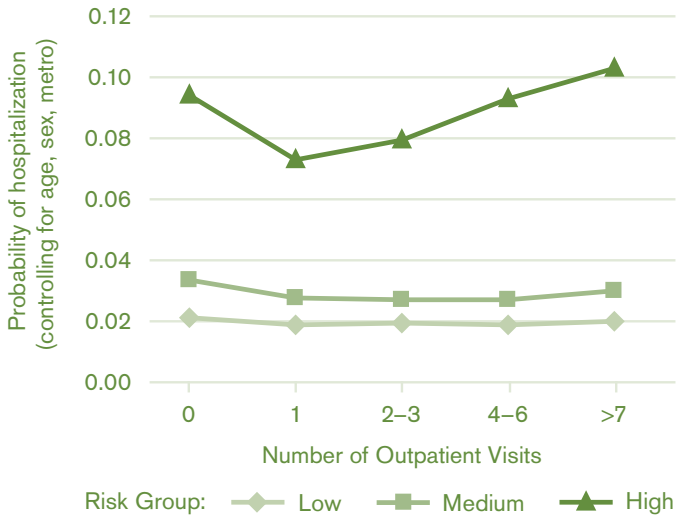
SOURCE: Tabulations from the 2007 Maryland Medical Care Data Base. Maryland residents aged 19–64, with private insurance and having used at least one professional service with a diagnosis of diabetes in 2007.

Figure 1 shows the use of non-emergency, ambulatory diabetes-related care by Maryland residents in the study population.[9] These visits included encounters with physicians and other health professionals such as nurse practitioners and podiatrists; visits were counted only if they included a diagnosis of diabetes. In 2007, the median number of visits in this group was three.[10] However, there was substantial variation in the use of care—16 percent of persons had no visits at all and 25 percent had seven or more visits. The number of visits also varied substantially by the level of expenditure risk—those who were most likely to need medical care (defined as high risk) were more than twice as likely to have seven or more visits as those with the lowest expenditure risk (36 percent versus 16 percent).

Among the study population, 9.4 percent were hospitalized or had an emergency room (ER) visit with a diabetes-related diagnosis in 2007 (see Figure 2). There were only very small differences in the proportion that used either inpatient or ER services by age and gender—females and those aged 19 to 50 had a slightly higher chance of having an ER visit than an inpatient stay; the reverse was true for males and for persons aged 51 to 64. Not surprisingly, differences by expenditure risk group were substantial—only 4 percent of those in the lowest risk group had either a hospital stay or an ER visit compared with 18 percent of those in the highest risk category. Persons in the high-risk group were also more likely to have an inpatient hospitalization than an ER visit, and persons in the low-risk group were more likely to have an ER visit than an inpatient stay.

HOW DOES THE USE OF OUTPATIENT CARE RELATE TO THE NEED FOR INPATIENT HOSPITAL AND EMERGENCY ROOM CARE? Studies of persons with diabetes, and the care they receive, provide some evidence that the use of outpatient care to treat and manage diabetes can help maintain good health and thus prevent the need for inpatient hospital care. Among the study population, the relationship between diabetes-related hospital inpatient care and ambulatory, non-emergency visits in the six months prior to the hospital stay is shown in Figure 3. For each person in a given health expenditure risk category, the number of ambulatory, non-emergency visits was compared with the number of times that diabetes-related inpatient care was used; this analysis was done holding constant age, gender, and whether a person lived in a metropolitan area.

FIGURE 3. Probability of a diabetes-related hospitalization in the second half of the year and number of non-emergency, outpatient visits in the six months prior among persons with diabetes, by health expenditure risk, 2007



The shape of the lines represents the impact of additional diabetes-related outpatient visits on the chances of a diabetes-related hospitalization. A downward-sloping line suggests that the use of non-emergency, ambulatory care was associated with reduced use of diabetes-related hospital care. The difference in the shape of the lines for the three risk groups suggests that the relationship between ambulatory visits and inpatient hospital use differed by expenditure risk category. Increasing the number of visits from zero to one resulted in a substantial drop in the likelihood of a diabetes-related hospitalization for a high-risk person with diabetes (from 9.4 percent to 7.3 percent) but a smaller decline for a medium-risk person with diabetes (from 3.3 percent to 2.8 percent). For an individual in the high-risk category, the likelihood of a hospitalization was lower with up to seven visits compared with having had no visits. Beyond seven visits, there appears to be limited or no additional value. This relationship may be because persons who used this much care were already severely ill, and ambulatory care could not prevent the need for diabetes-related hospital care.

HOW MUCH DOES HOSPITALIZATION AFFECT SPENDING FOR PERSONS WITH DIABETES? Ambulatory care for the treatment and monitoring of diabetes is important not only in preventing hospitalization and improving quality of life, but in avoiding unnecessary health care spending. Table 1 shows median spending on diabetes-related care in the study population and the impact of hospital stays on the level of spending.[11] The spending estimates in Table 1 include spending for diabetes-related professional services—the physician portion of care for both inpatient and outpatient services as well as services provided by other health care professionals such as podiatrists—and charges for diabetes-related inpatient stays.

The impact of inpatient hospitalization on spending is enormous. For the 95 percent of the study population that had no inpatient stays, median spending on professional services was about $342 for ambulatory care (both emergency and non-emergency services). As the number of hospital stays increased, spending on professional services increased slowly. For persons in the study population with one hospitalization, median spending was $485 ($356+$129), and for someone with four hospitalizations, median spending for professional services was less than twice that amount—$763 ($375+$388). Hospital charges, in contrast, increased dramatically—from $7,760 for one inpatient stay to almost $39,000 for four stays. For persons with four inpatient stays, the median length of stay in the hospital was 18 days.

IMPLICATIONS FOR SPENDING AND CARE MANAGEMENT In addition to the serious health issues associated with uncontrolled diabetes—including amputations, blindness, ischemic heart disease, and stroke—diabetes-related care is also costly, placing a financial burden on individuals and contributing to the overall increase in health care costs. Although this analysis focuses on non-elderly adults with private insurance coverage, costs for treating persons with diabetes in Maryland—across age and regardless of coverage—were approximately $3.7 billion in 2006. Thus, it is important to identify strategies for diabetes prevention and adherence to medical regimens.

This Spotlight presents information on the use of ambulatory and hospital-based care related to diabetes. In 2007, more than 8 in 10 persons in the study population of privately insured, non-elderly Maryland residents with diabetes used some outpatient, non-emergency care to health professionals related to their diabetes, and only 1 in 20 required an inpatient hospitalization. Yet, inpatient care accounted for the vast majority of diabetes-related

TABLE 1. Median spending for persons with diabetes, for all diabetes-related professional services and diabetes-related inpatient hospital stays, among privately insured, non-elderly adults with diabetes, 2007

NUMBER OF INPATIENT STAYS***	Percent Distribution*	Median spending for professional services for outpatient, non-emergency visits*	Median spending for professional services for inpatient and emergency room visits*	Median hospital charges for all inpatient stays**	Median length of stay (days) for all inpatient stays**
NONE	94.8%	$211	$131	n/a	n/a
1	1.4	356	129	$7,760	3
2	1.0	368	230	18,543	8
3	0.7	372	315	29,116	13
4	0.5	375	388	38,972	18

SOURCE: *2007 Maryland Medical Care Data Base (MCDB); **2007 hospital discharge data from Maryland Health Services Cost Review Commission. Note that the MCDB will include hospital claims beginning in 2010. ***Persons with more than five inpatient stays are excluded; the table accounts for more than 98 percent of the study population.[12]

spending. The median charge for an inpatient stay (for someone with just one stay) was nearly $8,000, and the median spending on non-emergency ambulatory care for persons in the study population with no hospitalizations was only $342. Thus, use of non-emergency outpatient care was not only much less costly than inpatient care but, as shown in Figure 3, a small increase in the use of non-emergency ambulatory care may, in some circumstances, reduce the need for hospitalization, creating substantial cost-savings.

Because the effect of outpatient visits on inpatient care varies by risk group and by level of use, appropriate approaches to improving care and reducing costs may need to be carefully targeted. For those individuals in the high-risk category who have both a large number of outpatient visits and a large number of hospitalizations, intensive case management—which includes care coordination—is indicated. The greatest potential to reduce costs may be among high-risk persons with no or few outpatient visits. These individuals could potentially benefit from diabetes management programs that involve health education classes and ongoing monitoring. Persons in lower risk groups, or those who are already using outpatient care, may benefit from approaches encouraging self-management and prevention of diabetes-related complications.

Policymakers can contribute by providing incentives to insurers and employers to cover preventive screenings and diabetes education initiatives. These initiatives should expand diabetes management programs to provide coverage for workplace wellness programs that support employees in achieving a healthy weight and a regular exercise regime. Providers should be partners in these initiatives and collaborate with diabetes educators to improve patient adherence and promote lifestyle change. The primary care medical home model has received increasing attention from payers and physicians as a way to provide timely and coordinated care. Based on evidence that chronic care management is best accomplished within a physician practice, one approach is to tailor the medical home model for management of individuals with chronic conditions.[13]

For persons with diabetes, improved glucose control has been shown to dramatically reduce complications related to the disease.[14] And, among persons at risk for type 2 diabetes, modest reductions in weight (5–7 percent) and increased physical activity (30 minutes of walking five days per week) can prevent or delay its onset.[15] Thus, beyond the traditional medical approaches, broad-based community-level efforts are needed to increase physical activity and healthy eating and to make changes in the built environment that encourage healthy lifestyles.

1 Behavioral Risk Factor Surveillance System (BRFSS), 2003-2008; from Maryland Diabetes Prevention and Control Program Fact Sheet. Office of Chronic Disease Prevention, Maryland Department of Health and Mental Hygiene, 2009. Available at *http://www.dhmh.state.md.us/.*

2 Behavioral Risk Factor Surveillance System (BRFSS), 2003-2008; from Maryland Diabetes Prevention and Control Program Fact Sheet. Office of Chronic Disease Prevention, Maryland Department of Health and Mental Hygiene, 2009. Available at *http://www.dhmh.state.md.us/.*

3 Accessed at *http://www.diabetes.org/living-with-diabetes/complications/.*

4 Behavioral Risk Factor Surveillance System (BRFSS), 2003-2008; from Maryland Diabetes Prevention and Control Program Fact Sheet. Office of Chronic Disease Prevention, Maryland Department of Health and Mental Hygiene, 2009. Available at *http://www.dhmh.state.md.us/.*

5 See, for example, Kim, Sunny PhD. "Burden of Hospitalizations Primarily Due to Uncontrolled Diabetes—Implications of Inadequate Primary Health Care in the United States," American Diabetes Association, Diabetes Care. 8 February 2007. DOI: 10.2337/dc06-2070. *http://care.diabetesjournals.org/content/30/5/1281.full*. Also see Anthony J. Greisinger, Rajesh Balkrishnan, Rahul A. Shenolikar, Oscar A. Wehmanen, Shahid Muhammad, P. Kay Champion. *Disease Management*. Winter 2004, 7(4): 325-332. doi:10.1089/dis.2004.7.325. Available at *http://www.liebertonline.com/doi/abs/10.1089/dis.2004.7.325.*

6 Soni, A. *Diabetes Management: Tests and Treatments among the Adult U.S. Civilian Noninstitutionalized Population*, 2007. Statistical Brief #269. November 2009. Agency for Healthcare Research and Quality, Rockville, MD. *http://www.meps.ahrq.gov/mepsweb/data_files/publications/st269/stat269.pdf.*

7 Most of the data in this report are based on services and payments captured in the 2007 Maryland Medical Care Data Base (MCDB), which includes insurance claim records of non-institutional and professional services rendered by physicians and non-physician health care professionals to patients who live in Maryland. Insurance companies and HMOs meeting certain criteria, namely, that they are licensed in Maryland and collect more than $1 million in health insurance premiums, are required to submit information to MHCC under the Code of Maryland Regulations (COMAR) 10.25.06. Data on charges for hospitalizations reported in Table 1 are based on the 2007 Maryland Hospital Discharge and Ambulatory Care Data.

8 MCDB data have been used to calculate user-specific health expenditure risk scores based on the Chronic Illness Disability Payment System (CDPS) developed by researchers at the University of California, San Diego. In this analysis, "low risk" refers to users with expenditure risk scores in the lowest third of the risk-score distribution, and "high risk" refers to those with scores in the highest third. The diagnoses used to determine an individual's expenditure risk score were those included on the individual's professional service health care claims only. It is worth noting that the expenditure risk scores for persons with diabetes as defined for this analysis were in the top one-half of the risk score distribution for all patients in the MCDB (for the full year, 2007).

9 Outpatient visits were defined based on professional services claims for services rendered in office-based and hospital outpatient settings. The study population included diabetes-related claims for services provided by most practitioners, with the exception of emergency room visits, lab and radiology services, and pathology services. In addition, based on the level of use by the study population, all services rendered by non-physician professionals were excluded, with the exception of the following specialists: podiatrists, optometrists, dieticians, and nurse practitioners.

10 The median number of visits represents that of the typical user, in which one-half of persons had more visits than that amount and one-half had fewer.

11 The median expenditure represents that of the typical user, in which one-half of persons spend more than that amount and one-half spend less. We present medians rather than means because of the highly skewed nature of the distribution in which there are a large number of users with very small expenditures and a small number of users with large expenditures.

12 Spending for professional services is from the 2007 Maryland Medical Care Data Base and includes ambulatory care as well as the care provided by non-hospital-based physicians in an inpatient setting. These tabulations are for Maryland residents aged 18–64, with private insurance and diagnosis of diabetes for at least one professional service in 2007. Dollar estimates for hospital stays are 2007 charges (rather than payments) from hospital discharge data collected by the Maryland Health Services Cost Review Commission. These estimates account for more than 98 percent of the study population.

13 Berenson RA, Hammons T, Gans DN, Zuckerman S, Merrell K, Underwood WS, and Williams AF. "A House Is Not a Home: Keeping Patients at the Center of Practice Redesign," *Health Affairs*. Vol. 27, No. 5, pp 1219–1230.

14 UK Prospective Diabetes Study Group: Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet*. 12 September 1998, 352(9131):837-853.

15 Diabetes Prevention Program Research Group. 10-year follow-up of diabetes incidence and weight loss in the Diabetes Prevention Program Outcomes Study. *Lancet*. 14 November 2009, 374(9702):1677-86.

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